

AMENDMENTS TO THE CLAIMS

The claims in this listing will replace all prior versions, and listings, of claims in the application.

1. (Original) A cam mechanism for a lens barrel, the mechanism comprising:

a cam ring comprising a cam groove which is open at one end; and

a support ring supporting an imaging component, the support ring having a cam follower engageable with said at least one cam groove and movable therein towards and away from said open end wherein the support ring is movable along an axis relative to the cam ring without rotation;

wherein said cam ring and said support ring each have respective guide surfaces engageable with each other when the cam follower is moved in the region of said open end and shaped to guide the cam follower at said open end of the cam groove during engagement.

2. (Original) The cam mechanism according to claim 1, wherein at least one guide surface of said guide surfaces is oblique to the axis.

3. (Original) The cam mechanism according to claim 1, wherein said guide surfaces are configured to guide the cam follower at the open end of the cam groove.

4. (Original) The cam mechanism according to claim 1, wherein said guide surfaces are configured to guide the cam follower to the cam groove when the cam follower has moved out of the open end of the cam groove and has been disengaged therefrom.

5. (Previously Presented) The cam mechanism according to claim 1, wherein said cam groove comprises a lead section which extends linearly in a direction inclined to said axis;

wherein one of said guide surfaces comprises a beveled surface located on an end face of one of said cam ring and said support ring and is generally parallel to said lead section; and

wherein the other of said guide surfaces comprises at least one contacting portion located on the other of said cam ring and said support ring and configured to slidingly contact said beveled surface.

6. (Original) The cam mechanism according to claim 5, wherein said beveled surface is located on both said cam ring and said linearly movable member, respectively.

7. (Original) The cam mechanism according to claim 1, further comprising a movement limiter configured to stop or limit disengagement of the cam follower from said open end of the cam groove.

8. (Original) The cam mechanism according to claim 1, wherein the cam mechanism is incorporated in a zoom lens.

9. (Original) The cam mechanism according to claim 8, wherein said cam groove has a zooming section configured to move said imaging component supported by said support ring, and an accommodating section configured to accommodate said support ring in a retracted position thereof.

10. (Original) A cam mechanism for a lens barrel which includes an imaging system, the mechanism comprising:

a linearly movable ring which supports an imaging element, having a cam follower, and guided linearly in an axis direction without rotating; and

a cam ring including a cam groove in which said cam follower is engageable,

wherein said cam groove comprises:

an imaging control section configured to move said linearly movable ring to an

imaging position in said axis direction; and

a standby section configure to move said linearly movable ring to a standby position different from said imaging position in said axis direction, one of opposite ends of said cam groove having an open end having a width greater than a width of said imaging control section such that a portion of said cam groove including said open end serves as said standby section, and

wherein said cam ring and said linearly movable ring comprise a first leading portion and a second leading portion which are engageable with each other to press said linearly movable ring in said axis direction to guide said cam follower to said imaging control section from said standby section by a rotation of said cam ring, when said cam follower is in said standby section.

11. (Original) The cam mechanism according to claim 10, wherein said cam groove comprises an inclined lead section which extends linearly in a direction inclined to said axis direction and connects said imaging control section with said standby section;

wherein said one of said first leading portion and second leading portion includes at least one beveled surface located on an end face of one of said cam ring and said linearly movable ring and generally parallel to said inclined lead section of said cam groove; and

wherein the other of said first leading portion and said second leading portion includes at least one contacting portion located on the other of said cam ring and said linearly movable ring and configured to slidingly contact said beveled surface.

12. (Original) The cam mechanism according to claim 11, wherein said beveled surface comprises a first beveled surface and a second beveled surface located on said cam ring and said linearly movable ring, respectively.

13. (Original) The cam mechanism according to claim 10, wherein said cam ring and said linearly movable ring comprise a movement limiter configured to limit movement of said linearly movable ring relative to said cam ring in a direction of disengaging said cam follower from said cam groove through said open end in said standby section when said cam follower is positioned in said standby section.

14. (Original) The cam mechanism according to claim 10, wherein said imaging system is a retractable zoom lens which is retractable into a camera body;

wherein said imaging system includes a plurality of optical elements including said imaging element;

wherein said imaging control section includes a zooming section configured to move said imaging element, which is supported by said linearly movable ring, in said axis direction relative to another optical element included in said plurality of optical elements in a predetermined moving manner to change focal length; and,

wherein said standby section comprises an accommodating section which accommodates said linearly movable ring in a retracted position thereof when said imaging system is retracted into said camera body.

15. (Original) A cam mechanism of an imaging system, the mechanism comprising:

a linearly movable ring which supports an imaging element, having a cam follower, and guided linearly in an axis direction without rotating; and

a cam ring including a cam groove in which said cam follower is engageable, said linearly movable ring movable between an imaging position and a standby position due to engagement of said cam follower with said cam groove when said cam ring rotates,

wherein one of opposite ends of said cam groove having an open end such that said cam follower is disengaged from said cam groove through said open end when said linearly movable ring is positioned in said standby position, and

wherein said cam ring and said linearly movable ring comprise a first leading portion and a second leading portion which are engageable with each other to press said linearly movable ring in said axis direction to guide said cam follower into said open end of said cam groove by a rotation of said cam ring, when said cam follower is disengaged from said cam groove through said open end.

16. (Original) The cam mechanism according to claim 15, wherein said cam groove comprises an inclined lead section which extends linearly from said open end in a direction inclined to said axis direction;

wherein one of said first leading portion and said second leading portion includes at least one beveled surface located on an end face of one of said cam ring and said linearly movable ring and generally parallel to said inclined lead section of said cam groove; and

wherein the other of said first leading portion and said second leading portion include at least one contacting portion located on the other of said cam ring and said linearly movable ring and configured to slidingly contact said beveled surface.

17. (Original) The cam mechanism according to claim 16, wherein said beveled surface comprises a first beveled surface and a second beveled surface located on said cam ring and said linearly movable ring, respectively.

*Insert
Claims 18-19*
20 18. (New) A digital camera having a body, an image pickup device and a cam mechanism, the camera further having an image display panel affixed to the body for

displaying an image picked up by the image pickup device, the image pickup device and cam mechanism housed within the body, said cam mechanism comprising:

a cam ring comprising a cam groove which is open at one end; and

a support ring supporting an imaging component, the support ring having a cam follower engageable with said at least one cam groove and movable therein towards and away from said open end, wherein said support ring is movable along an axis relative to said cam ring;

wherein said cam ring and said support ring each have respective guide surfaces engageable with each other when the cam follower is moved in the region of said open end and shaped to guide the cam follower at said open end of the cam groove during engagement.

21. ²⁰19. (New) The camera according to claim ²⁰18, wherein at least one guide surface of said guide surfaces is oblique to the axis.

22. ²⁰20. (New) The camera according to claim ²⁰18, wherein said guide surfaces are configured to guide the cam follower at the open end of the cam groove.

23. ²⁰21. (New) The camera according to claim ²⁰18, wherein said guide surfaces are configured to guide the cam follower to the cam groove when the cam follower has moved out of the open end of the cam groove and has been disengaged therefrom.

24. ²⁰22. (New) The camera according to claim ²⁰18, wherein said cam groove comprises a lead section which extends linearly in a direction inclined to said axis;

wherein one of said guide surfaces comprises a beveled surface located on an end face of one of said cam ring and said support ring and is generally parallel to said lead section; and

wherein the other of said guide surfaces comprises at least one contacting portion

located on the other of said cam ring and said support ring and configured to slidingly contact said beveled surface.

²⁵~~23~~ (New) The camera according to claim ²⁴~~22~~, wherein said beveled surface is located on both said cam ring and said linearly movable member, respectively.

²⁶~~24~~ (New) The camera according to claim ²⁸~~18~~, further comprising a movement limiter configured to stop or limit disengagement of the cam follower from said open end of the cam groove.

²⁷~~25~~ (New) The camera according to claim ²⁹~~18~~, wherein the camera is a zoom lens camera.

²⁸~~26~~ (New) The camera according to claim ²⁷~~25~~, wherein said cam groove has a zooming section configured to move said imaging component supported by said support ring, and an accommodating section configured to accommodate said support ring in a retracted position thereof.

Rule
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